

REMARKS

The Non-Final Office Action mailed January 13, 2009 and the references cited therein have been carefully considered and Applicants respectfully request reconsideration. Claims 1-14 are currently pending in this application. By this Response, Applicants have amended Claims 2 and 9, and added Claim 15. New Claim 15 includes the recitation deleted from 2, thus introduced as a further depended claim as suggested by the Examiner in the subject Office Action. The amendment to the claims are introduced herein solely to address the claim rejections under 35 U.S.C. § 112, second paragraph, as address further below. Accordingly, no new matter is presented by these amendments. The amendments to the claims are not intended by the Applicants to change or limit the scope of the claims herein, particularly with regard to the prior art. Entry of these amendments is respectfully requested.

Applicants respond specifically below to the issues raised in the subject Office Action and respectfully request reconsideration thereof.

Claim Rejections under 35 USC § 112

In the Office Action, Claims 2 and 9 have been rejected under 35 USC § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Office Action rejects the use of the expression “preferably...” in Claim 2 and the “one of the light-scattering matt structures” lacking antecedent basis in Claim 9. Thus, Applicants by the amendments presented herein have eliminated the rejected expression and reworded Claim 9 to provide proper antecedent basis therein. The amendments to the claims are not intended by the Applicants to change or limit the scope of the claims herein, particularly with regard to the prior art. Accordingly, Applicants respectfully request reconsideration and withdrawal of this rejection in view of the amendments made herein.

Claim Rejections under 35 USC § 103

In the Office Action, Claims 1-14 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,402,571 to Cowan et al. (**Cowan**) in view of Japanese Published Application No. 8-137375 to Inaba (**Inaba**) and further in view of German Published Patent Application No. 100 28 426 to Rösler (**Rösler**). Applicant respectfully traverse this/these rejection(s).

Initially, with regard to the Examiner's request for Applicants to provide an English language equivalent or translation of Rösler, if such is readily available, please note that Applicants are not currently aware of any English language equivalent or translation of this document, other than the Abstract already provided. Applicants understanding of the Rösler disclosure is provided below along with further remarks regarding the disclosure therein. Please note that while Applicants are able to read this German document, the preparation of a certified translation would be costly and/or burdensome. Thus, as the Office Action had only requested a translation **if readily available**, no formal translation has been prepared.

In the Office Action, **Cowan** is cited as disclosing "a method of forming light-diffracting microstructures in a layer of photoresist on a substrate" as more specifically recited in the instant Claim 1, steps c), d), e) and f). The Office Action acknowledges that Cowan fails to explicitly teach drying the photoresist after development and producing light-diffracting microstructures on a first relief structure already formed on the photoresist. Thus, the Office Action combines elements of other cited prior art references to arrive at the claimed invention, which contention Applicants traverse.

Cowan discloses exposing a photosensitive material (also referred to as a photoresist) to light at a first position and a second position by means of a laser interference pattern. The photoresist contains a photosensitive polymer which when exposed to light becomes soluble in an appropriate water base developer. After exposure and development, the initially flat surface of the photoresist becomes a surface relief structure (see, Col. 1, lines 17-25). A two-

dimensional grating (crossed grating) is obtained instead of a linear grating by rotating the photosensitive material 90° about an axis perpendicular to the centre of the surface of the photoresist subsequent to the first exposure and exposing the material a second time (see, Col. 1, line 52 to Col. 2, line 6). Cowan discloses that different relief structures can be obtained by varying the development time (i.e., the duration of the exposure to light; see, Col 6, lines 62-63 and Figs. 3a, 3b, 4a-4c, 5a, 5b). In Cowan, consecutive steps of exposure are performed in such a way that results form a two-dimensional hole-shaped pattern (see, Fig. 3a, Fig. 3b, Fig. 6, Fig. 7c).

Therefore, as conceded in the Office Action, Cowan does not disclose that a surface relief is formed in a photoresist by a stamping process before exposure to light. Furthermore, the two steps of exposure to light as described in Cowan represent two steps of light exposure for producing a common structure. Thus, Cowan teaches using two steps of light exposure, where the two steps are adapted to each other, in order to arrive at a special structure. Using Cowan as a primary reference, a person skilled in the art would not be led to replace one of the steps of light exposure with a step of forming a relief structure by a stamping process. Without the double-exposure process taught by Cowan, the special structures taught therein would not be achieved. In fact, the special structures of Cowan can only be formed by superimposing two separate exposures to light, during the two steps of light exposure. As a consequence, based on Cowan a person skilled in the art would not replace one of the steps of exposure to light with a mechanical die shaping process. Accordingly, there is no motivation or reason to alter the disclosure of Cowan as suggested in the Office Action.

Additionally, contrary to the suggestion in the Office Action, there is no reason other than hindsight to form a relief structure with a die on the photoresist prior to performing the dual exposure process. In fact, Cowan teaches away from preliminarily adding the formation of a relief structure using a die. It should be noted that the techniques disclosed by Cowan are limited to exposing flat surfaces of a photoresist for varied durations in order to achieve an array of steep spires or peaks (see, Col. 7, lines 1-4 and Fig. 5), or even lollypop shaped spaced spires (see,

Col. 7, lines 13-17 and Fig. 6). There is absolutely no teaching or suggestion to apply such techniques to a first relief structure formed by a relief die or any non-flat surface. In fact, Cowan stresses the importance of achieving a uniform linear response from the photoresist, which teaches away from the alteration suggested in the Office Action. Cowan specifies that a uniform light pre-exposure is used in order to achieve a profile that has a linear response (Col. 6, lines 35-37). Also, Cowan specifies that any subsequent exposure should yield a linear etch rate response to the photoresist (Col. 6, lines 48-49). A non-flat surface of varied thickness will not linearly respond, thus having a varied etch rate, which is contrary to the teachings of Cowan. Accordingly, there is no teaching or suggestion in the prior art to achieve a coarse pattern and fine pattern formation, by the process recited in the subject Claims. In fact, doing so runs contrary to the teaching of the prior art.

Further, in the Office Action **Inaba** is cited for disclosing the formation of a relief structure on a photoresist by using a die and then removing the die prior to curing the resist. Inaba describes providing a base with a photosensitive thermoplastic resin composition, to shape a surface relief by stamping and then to subject the surface of the relief patterns to irradiation with light via an arbitrary mask (see, Figs. 1-5). The transmission quantity of light is varied by the mask so that the relief image forming material is varying in the degree of curing. Subsequently, the layer is softened and deformed by heating at a specific temperature by which visually distinguishable contrasts are generated. A person skilled in the art would not consider combining the teachings of Cowan with Inaba. Particularly, since the photosensitive polymer used in Cowan requires a dissolution characteristics in a developer dependent on the intensity of light exposure. The photoresist in Cowan becomes soluble in an appropriate water base developer when exposed to light. In contrast, Inaba uses a thermosetting photosensitive material whose degree of softening by heating at a specific temperature depends on the intensity of light exposure, i.e. the degree of curing. Thus, Cowan and Inaba require completely different photosensitive materials and thus are related to two totally different methods which cannot be

combined as such. Accordingly, one of ordinary skill in the art would find no reason or motivation to combine the disclosures of Cowan and Inaba.

Yet further in the Office Action, **Rösler** is cited for disclosing a method of forming a coarse structured pattern on a photoresist followed by forming a fine structured pattern thereon by interference of an exposure beam. It is Applicants' understanding that Rösler discloses a method which involves exposing a photosensitive material to a spatially formed coarse structure in a way that a fine structure is generated during light exposure by interference of the exposure beam which is deflected and/or scattered by the coarse structure with the original exposure beam. In Rösler the coarse structure is formed with recesses in the flanks (see particularly, Rösler Claim 1). The coarse structures are formed by holographic light exposure (see, Col. 2, lines 2-17; Col. 4, line 9) or by a selective etching process (see, Col. 4, line 55). Alternatively, Rösler refers to "crystal growth" for the coarse structures (see, Col. 2 lines 16-24). The resulting combined structures can also be used as embossing dies (see, Col. 5 lines 5-10). Hence, Rösler does not explicitly disclose that the coarse structure is shaped in a photosensitive material by means of an embossing die. Furthermore, Rösler does not describe that the coarse structure is exposed to light by an interference pattern consisting of two interfering light beams according to steps c) and d). Rather, in contrast, Rösler discloses that the interference effects are generated by the coarse structure itself. As a consequence, an orientation and/or coordination of the interference pattern with respect to the coarse structure does not take place.

There is no reason to combine Cowan and Rösler as they achieve their individual results in very different ways. Cowan generates only a primary relief structure through the interaction of two sets of maxima intensity lines on a submicrometer scale and is performed on a flat surface. In contrast, Rösler uses an interaction of penetrating light diffracted by an initial coarse structure. Thus, Cowan and Rösler disclose very different methods to achieve very different structures (a single fine structure shaped as a pattern of small holes as disclosed in Cowan versus a maximal surface with fine structure on its flanks as disclosed in Rösler). As discussed above, Cowan teaches away from using its methods on a non-flat medium. What is more, neither

Cowan nor Rösler disclose the formation of a coarse structure using a stamping technique. Further, although the Office Action cites Inaba for the teaching of producing a coarse structure by stamping, one of ordinary skilled in the art would never combine this technical step with the teaching of Cowan or Rösler. As discussed above, these disclosures use very different materials that are not interchangeable. Thus, one can not combine the teaching of Cowan, Rösler and Inaba without encountering significant problems in material selection. Additionally, even if one of ordinary skill where to form the coarse structure of Rösler using the stamping technique of Inaba, the resulting structure would lack the interference pattern taught by Cowan, which is not combinable with Inaba.

Further, it is inappropriate in forming a prior art rejection, to use the claimed invention as a roadmap along with hindsight, to argue that the prior art discloses the claimed invention. There is no clear reason or suggestion in the prior art or any other source to combine Cowan, Rösler or Inaba, as suggested in the subject Office Action. In the Office Action, at page 3, it is suggested that Rösler provides the motivation to combine Cowan and Inaba, but no reason to combine is given. What is more, the technical difficulties in attempting to combine those two disparate teaching are not addressed. Accordingly, Applicants respectfully request reconsideration in this regard, since one of ordinary skill in the art would not consider combining these references and would not arrive at the claimed invention.

In view of the foregoing remarks, Applicants respectfully request reconsideration and allowance of the claims presented. Thus, combination of disclosures of Cowan, Inaba and Rösler do not lead to all the limitations of the claimed invention, particularly Claim 1. Applicants further submit that the Claims 2-15, which ultimately depend from Claim 1 are similarly patentable over the art of record by virtue of their dependence. Also, Applicants submit that claims 2-15 define patentable subject matter in their own right. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of Claims 1-14 under 35 U.S.C. § 103(a).

Application Serial No. 10/555,422
Docket No. 1093-140 PCT/US
Response to January 13, 2009
Non-Final Office Action

Conclusion

Entry of the amendments herein and favorable consideration of Claims 1-15 are hereby solicited. In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner has any questions or suggestions to expedite allowance of this application, the Examiner is cordially invited to contact Applicant's attorney at the telephone number provided.

Respectfully submitted,

/tony a. gayoso/

Tony A. Gayoso

Registration No.: 37,331

Attorney for Applicant

HOFFMANN & BARON, LLP
6900 Jericho Turnpike
Syosset, New York 11791-4407
(516) 822-3550

TAG:
313635_1.DOC